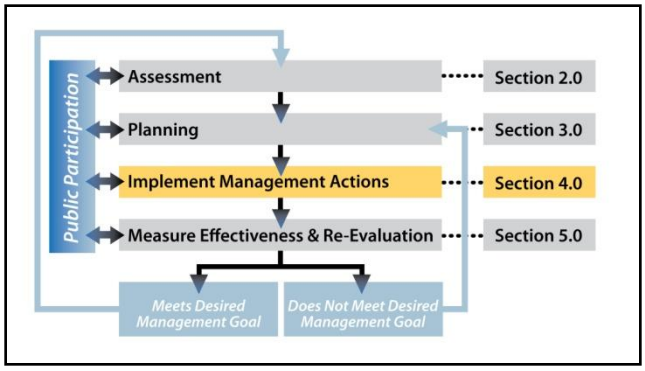
# 4.0 IMPLEMENTATION




The Implementation component of the Integrated TMDL Watershed Approach defines a framework for Dischargers to implement watershed activities in an assessable, effective, cost-efficient manner over the 20-year TMDL Compliance Schedule. Phase I of the Implementation Plan focuses on the first five years of the TMDL Compliance Schedule. Planning and Implementation of Phase II (years 5–10) and Phase III (years 10–20) will build upon the outcomes of the watershed activity effectiveness assessments from Phase I.

## 4.1 Watershed Activity Implementation

Each Discharger developed a list of watershed activities to implement during the first five years of the TMDL Compliance Schedule (see Watershed Activities Lists in Appendix B). In developing their individual Watershed Activities Lists, the Dischargers explored opportunities for partnership and collaboration among Discharger agencies to leverage resources and sought input from stakeholders. As stated above, the suite of watershed activities slated for implementation in Phase I are critical not only for their potential to achieve pollutant load reductions, but also because knowledge gained regarding their cost effectiveness will provide a solid basis for increased planning and implementation efforts in Phases II and III.

To assist in coordinating these parallel efforts of implementation and effectiveness measurement (see Section 5.0 for information regarding effectiveness assessment), the Dischargers developed the following information and tools:

- The Dischargers created a series of flow charts that identify prioritized sequences of steps for implementing each watershed activity (Implementation Tool, Tool E of Appendix D).
- The Dischargers linked each watershed activity to a final goal that the activity strives to achieve at the end of Phase I.
- To clarify the linkages between this Implementation Plan and other efforts in San Diego County, the Dischargers identified activities implemented within the Chollas Creek Watershed and activities implemented within and/or beyond the boundary of the watershed in Tool E. The Dischargers will share information and will apply lessons learned in the region with the goal of improving water quality in the Chollas Creek Watershed.
- All watershed activities have the potential for Discharger-to-Discharger information sharing and partnering. In their Watershed Activity Lists, Dischargers also identified additional opportunities for partnering and leveraging with other agencies and stakeholders, as appropriate.

Example watershed activities to be implemented by Discharger are described in the sections below.

### 4.1.1 Southcrest Park Large Infiltration Best Management Practice Project

The City of San Diego is taking the lead on the design and implementation of a Tier II Large Infiltration BMP at Southcrest Park located in Priority Sector 1. The project goal is to capture and infiltrate a volume equal to runoff from the five year storm event entering the storm drain system from the paved parking area and vicinity of Southcrest Park. This volume of storm water will be captured and infiltrated resulting in pollutant reductions that will achieve the TMDL WLAs for dissolved metals, bacteria, and pesticides. This multi-component LID presented on Figure 4-1 includes the following:

- New pervious concrete paving and base, which will be installed in place of the existing asphalt paving at multiple locations.
- A below-grade storage and infiltration basin will be installed within the grassy areas of Southcrest Park. The project will include diversion structures to divert runoff from the existing storm drain system through a hydrodynamic separator to these grassy infiltration areas. When the below-grade infiltration basin is full, additional flows will pass through the system via an outflow pipe at the downstream end of the infiltration basin. This overflow pipe will connect to the existing storm drain system and will convey flows downstream as in existing conditions.
- Five rain barrel / downspout disconnect systems will be installed. These flow reduction structures which capture, hold, treat, and utilize roof runoff from the roof and gutters of the Southcrest Recreation Center for irrigation are being installed under a separate program.
- A restoration opportunity was identified during conceptual design of the Large Infiltration BMP Project. The restoration project was conceptualized with assistance from stakeholders during the design workshop on March 30, 2009. Details regarding this restoration project have been included in the City of San Diego's Watershed Activity List (Appendix B) and Appendix E.

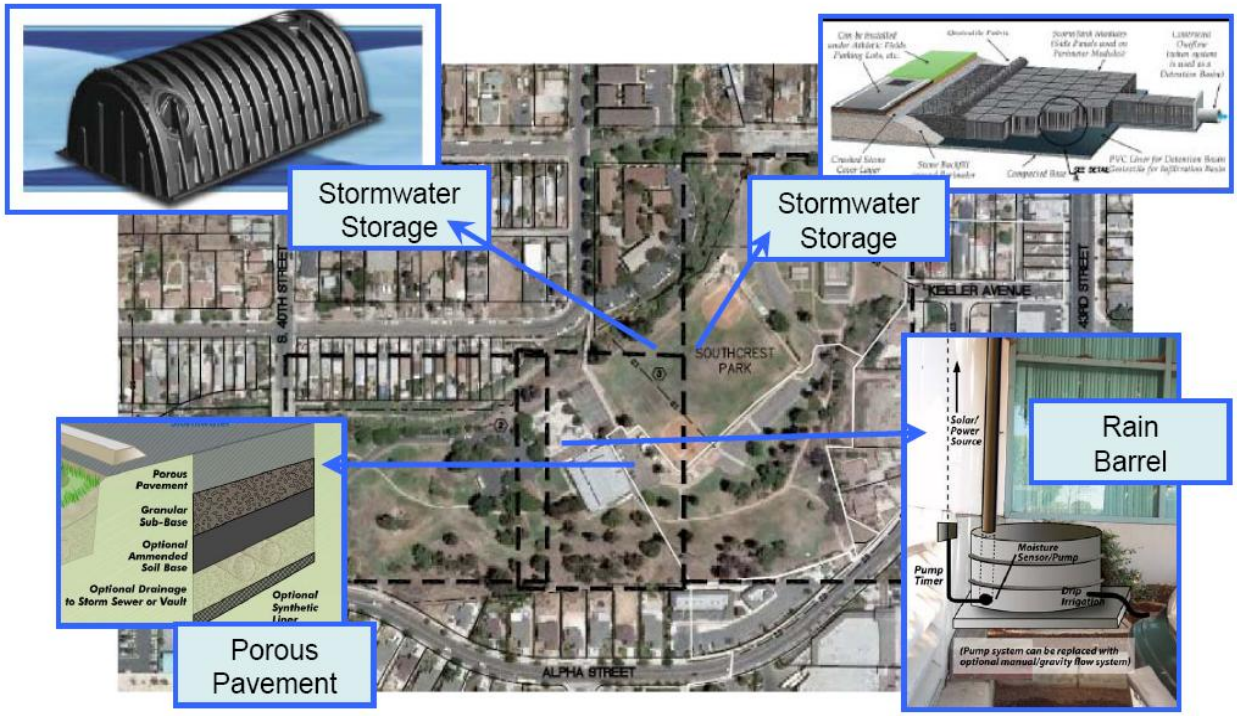



**Figure 4-1. Conceptual Design for Southcrest Park Large Infiltration Best Management Practices**

#### *4.1.1.1 Assessment Questions for the Southcrest Park Large Infiltration Best Management Practice Project*

*Load Reduction Effectiveness Assessment:*

Does the implementation of an LID BMP retrofit result in a detectible receiving water quality improvement? (Level 4: Load Reduction Effectiveness Assessment, Level 6: Improved Receiving Water Quality)

*Management Questions:*

Has the LID BMP retrofit optimized its efficiency (i.e., pollutant load reduction/cost)?

What is the optimal efficiency of LID BMP retrofits so that the City can direct resources to the most efficient programs?

#### *4.1.1.2 Timeline*

- Conceptual Design Completed – FY2008.
- Final Engineering Design Start Date – FY2009.
- Potential Construction Start Date – FY2012.

### 4.1.2 Chollas Creek Runoff Reduction and Groundwater Recharge Project

The County of San Diego's Chollas Creek Runoff Reduction and Groundwater Recharge Project will demonstrate the practical implementation of a range of LID techniques to reduce runoff

from three County of San Diego facilities within the Chollas Creek Watershed. Existing impervious areas (i.e., parking lots) at each facility will be retrofitted using LID techniques to capture runoff. A goal of this demonstration project is to employ techniques to capture and infiltrate rainfall to prevent transportation of potentially polluted runoff from leaving these facilities and entering the storm water system, including Chollas Creek. Storm water will be captured and infiltrated resulting in pollutant reductions in WLAs for heavy metals and sediment reduction.

All three facilities occupy sites that are highly impervious. The project will include demonstrations of porous pavement over stone reservoirs, capture and capture/infiltration technologies, as well as landscape elements such as rain gardens and bio-swales. The County of San Diego's Department of General Services will be responsible for design, construction, and implementation of these Tier II LID Pollution Control BMPs at the three facilities shown on Figure 4-2. The three facilities include the following:

- **Central Regional Public Health Facility – 5201 University Street (0.5 acre)—** Includes the design and installation of approximately 10–12,000 $ft^2$ of porous asphalted pavement. The design will include berms where necessary to prevent storm water from entering or exiting the area of work for monitoring purposes.
- **Comprehensive Health Center – 551 35$^{th}$ Street (1.5 acres)—**Includes design of the capture and infiltration of runoff by sizing concrete detention/infiltration vaults under two parking lots within the facility. This project also includes locating and sizing catch basins and piping to carry storm water to the detention/infiltration vaults, and designing any necessary berms to direct flows and any necessary pre-treatment devices to reduce the discharge of trash and debris into the detention/infiltration vaults.
- **Dodson House / Work Furlough Building – 3177 Oceanview Boulevard (2.9 acres)—** Includes the design and installation of landscaped/vegetative bio-retention/bio-infiltration measures consisting of three bio-swales with hydroseed specifications and two rain gardens. This project also includes design modifications to portions of the existing storm drain system, concrete swales, and use of energy dissipaters to direct the flow and volume of storm water and irrigation to the swales and rain gardens.

It is anticipated that the project will have direct impact on water quality by reducing the runoff from three highly impervious sites within the watershed and will serve as a series of demonstrations for the owners of other highly impervious properties of how to reduce runoff from these sites. The project will address dissolved copper, lead, and zinc, and sediment.

#### *4.1.2.1 Assessment Questions for the Chollas Creek Runoff Reduction and Groundwater Recharge Project*

*Effectiveness Assessment Questions:*

What are the pollutant load reductions achieved by the use detention/infiltration vaults, porous pavement, and landscaped/vegetative swales BMPs based on influent and effluent water quality data? (Level 4)

*Management Questions:*

What are the operations and maintenance costs?

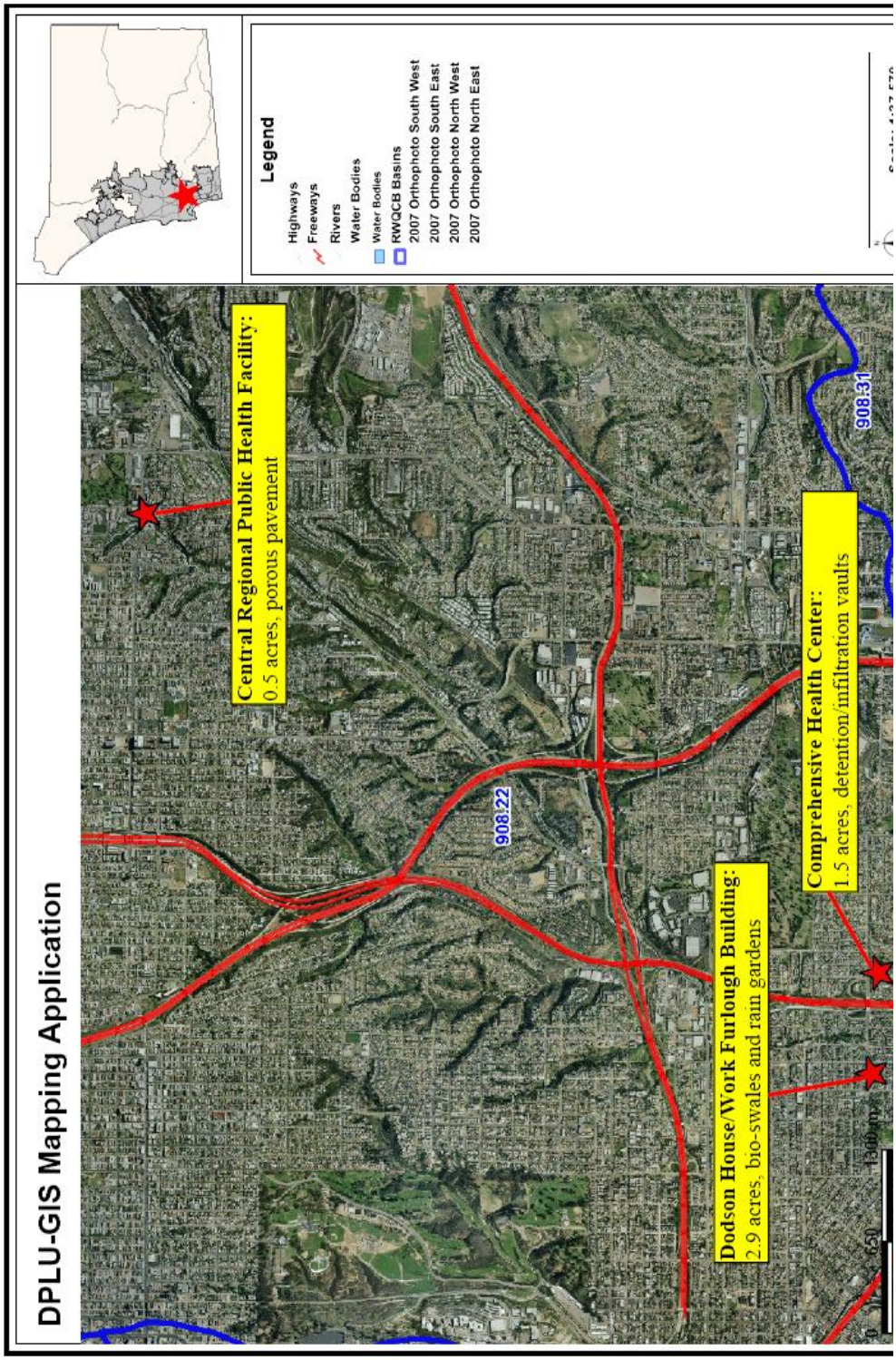



**Figure 4-2. Map of Three Low Impact Development Best Management Practice Project Locations**

#### *4.1.2.2 Timeline*

- Concept Design Completed – FY2008.
- Final Design and Bid Package Complete – FY2008.
- Implementation – FY2009 (contingent upon receipt of grant funding).
- Assessment – FY2009 – 2011.
- Final Report – FY 2011.

### 4.1.3 Biofiltration Swale Project

Caltrans will install Tier III biofiltration swales in the Chollas Creek Watershed at various locations. Specific locations to be determined in the future during final engineering design. Biofiltration swales are vegetated channels, typically configured as trapezoidal or V-shaped channels that receive and convey storm water flows while meeting water quality criteria and other flow criteria. Pollutants are removed by filtration through the vegetation, sedimentation, adsorption to soil particles and infiltration through the soil. The project goal is to capture storm water runoff from the water quality storm event entering the storm drain system from the freeway paved area. This volume of storm water will be captured resulting in pollutant reductions that will assist in achieving the TMDL WLAs for dissolved metals.

An example bioswale project that was installed by Caltrans along south bound Interstate 5 north of Palomar Airport Road is presented on Figure 4-3. Caltrans will design these bioswales with adequate hydraulic capacity for a 25-year storm. Caltrans, in cooperation with the State Board, developed design criteria for water quality flow through bioswales specific to rainfall intensities. Slopes in the direction of flow are preferred to be between 1–2%. The bioswales will typically be trapezoidal in shape, have a minimum bottom width of 2 ft, and a maximum of 10 ft. Side slopes will be 1:4 or flatter. Maintenance concurrence will be required for the location and bottom width.

**Figure 4-3. Example of a Pilot Bioswale along South Bound Interstate 5 North of Palomar Airport Road**

Swales are effective for trapping litter, total suspended solids (i.e., soil particles), and particulate metals. The system shall be designed to provide treatment for dissolved metals and total metals loads. Aside from the hydraulic requirements, vegetative cover is a critical factor in the effectiveness of this type of treatment BMP. Specific plant establishment measures may be incorporated to ensure effectiveness of the BMP.

#### *4.1.3.1 Assessment Questions for the Biofiltration Swale Project*

*Effectiveness Assessment Questions:*

What are the pollutant load reductions achieved by the bioswales? (Level 4 and Level 6)

Results from Caltrans pilot studies have been reported for technical feasibility and cost. The average load reductions for multiple bioswales implemented in San Diego and Los Angeles are presented in Table 4-1 (Caltrans, 2004).

**Table 4-1. Average Concentration Reductions for Multiple Bioswale Projects in San Diego and Los Angeles**

| Constituents | MEAN Event Mean Concentration | | Percent Removal |
|---|---|---|---|
| | Influent (mg/L) | Effluent (mg/L) | |
| **Total Suspended Solids** | 94 | 74 | 49 |
| **Dissolved Copper** | 0.024 | 0.012 | 49 |
| **Dissolved Lead** | 0.018 | 0.007 | 57 |
| **Dissolved Zinc** | 0.170 | 0.045 | 74 |
| **Total Copper** | 0.049 | 0.019 | 63 |
| **Total Lead** | 0.099 | 0.031 | 68 |
| **Total Zinc** | 0.349 | 0.079 | 77 |

*Management Questions:*

Questions regarding effectiveness of the bioswales in pollutant removal efficiency and maintenance cost have already been addressed by Caltrans Pilot Study results as shown in Table 4-1.

#### *4.1.3.2 Tentative Timeline*

- Concept Design Completed – To be determined pending fund availability.
- Final Design and Bid Package Complete – To be determined, pending fund availability.
- Implementation – To be determined, pending fund availability.